

Analyze Surface Charts

Module 5

Objective

Analyze isobars, troughs, fronts, pressure centers, isotherms, on a surface chart to the satisfaction of the evaluator as indicated by a Go/No Go checklist.

Surface Analysis

- The main goal of analysis is to locate and find phenomenon that has the potential of affecting the mission and your forecast

Uses of Surface Analysis

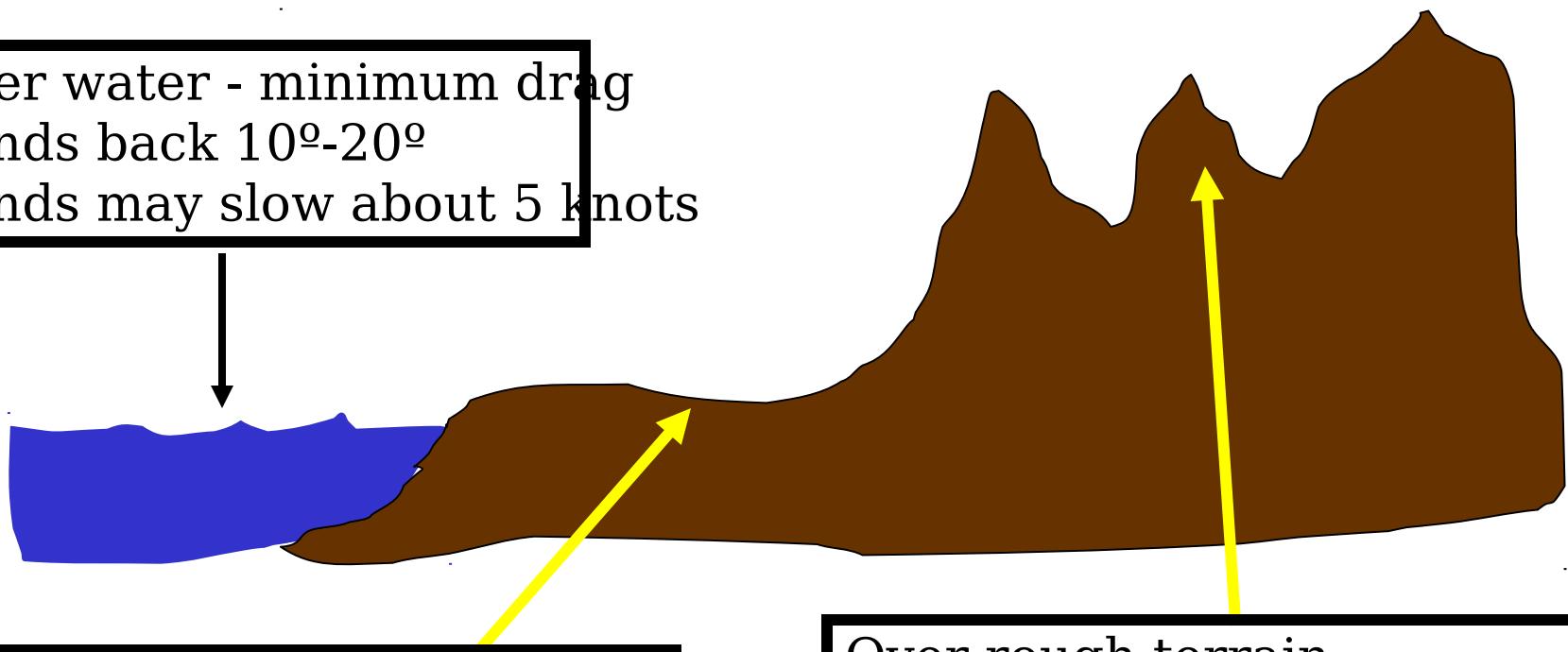
- Locating pressure systems
- Locating fronts
- Locating temperature trends and adve
- Determine surface winds

Analysis Considerations

- Isobars
- Pressure centers
- Troughs
- Isotherms
- Fronts
- Dew Point
- Wind Direction and Speed
- Present Weather
- Clouds
- Visibility

Frictional Effects

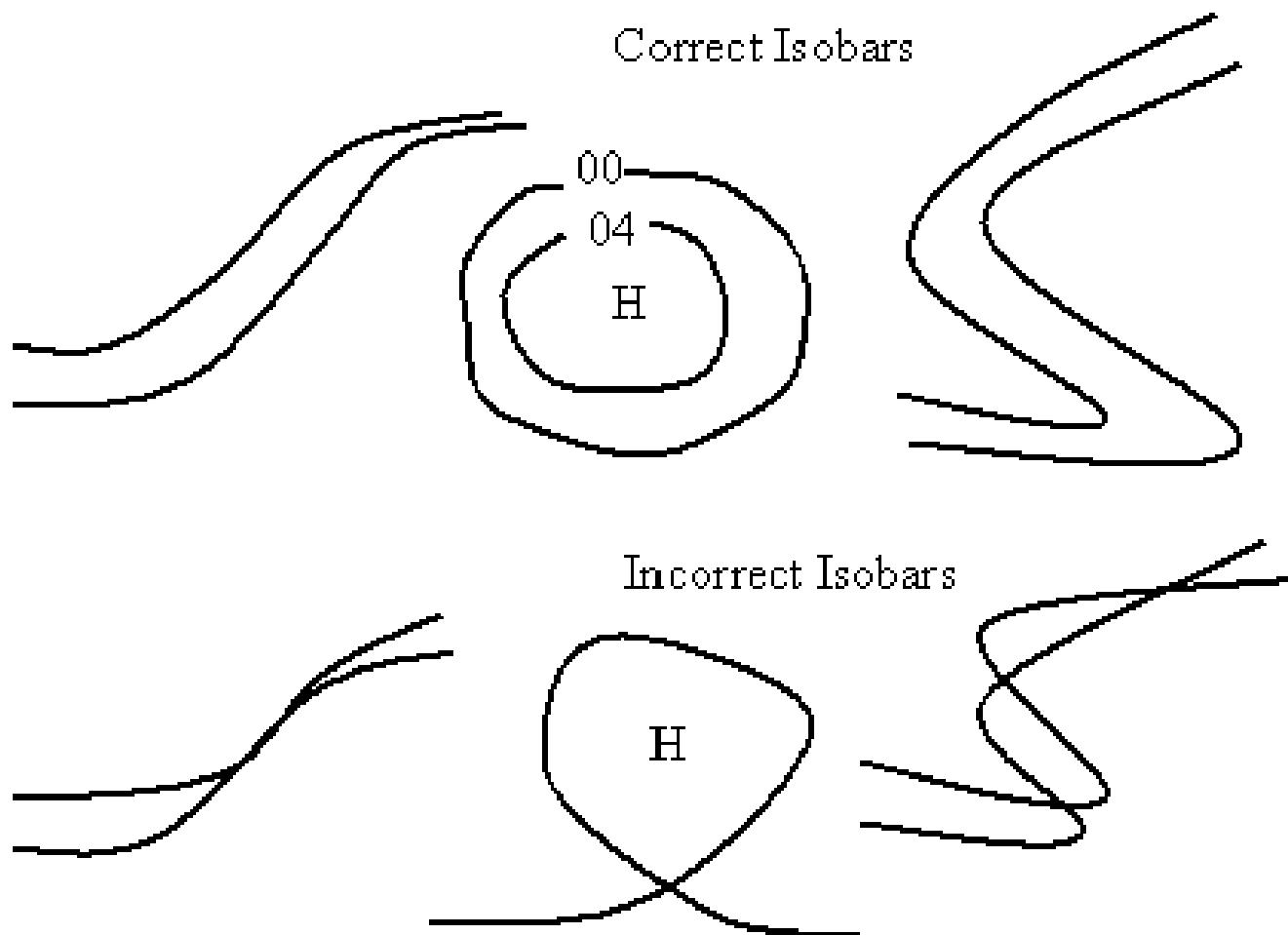
Over water - minimum drag
Winds back 10° - 20°
Winds may slow about 5 knots



Over smooth terrain-
Moderate drag
Winds back 15° - 30°
Winds may slow about 10 knots

Over rough terrain-
Maximum drag
Winds back 20° - 40°
Winds may slow about 10-15 knots

Analysis Procedures- Isobars



Purpose of Isobaric Analysis

- Shows small-scale features
- Isobars are drawn at intervals necessary to show detail

Analysis Considerations - Isobars

- Isobars must be drawn proportional to the pressure gradient
- Isobars must show an abrupt change in direction

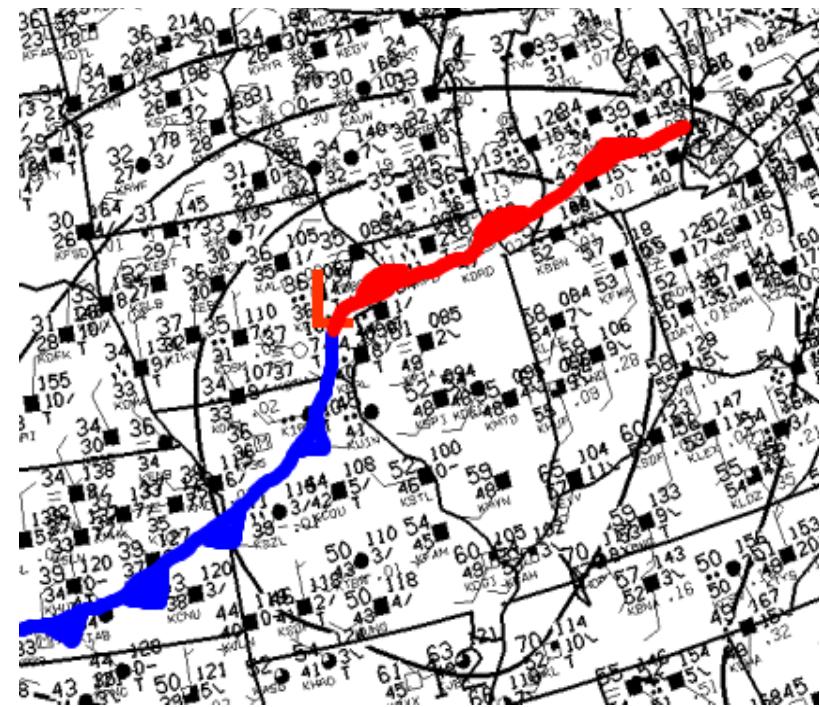
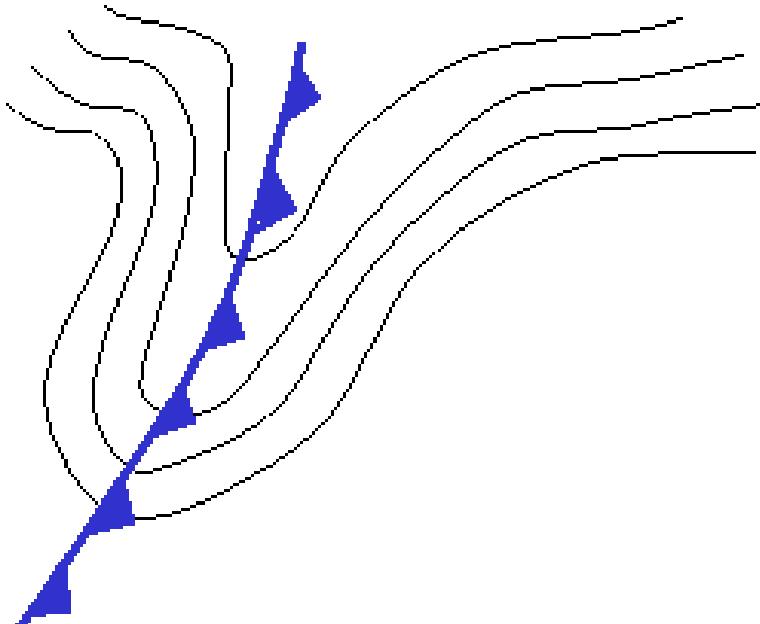
Analysis Procedures- Fronts

- Move at a percentage of the second standard level winds
- Shows logical continuity from previous positions
- Lie in troughs of low pressure

Analysis Procedures - Fronts

- Significant pressure tendency difference
- Cyclonic winds
- Dew point differences
- Fronts are on warm side

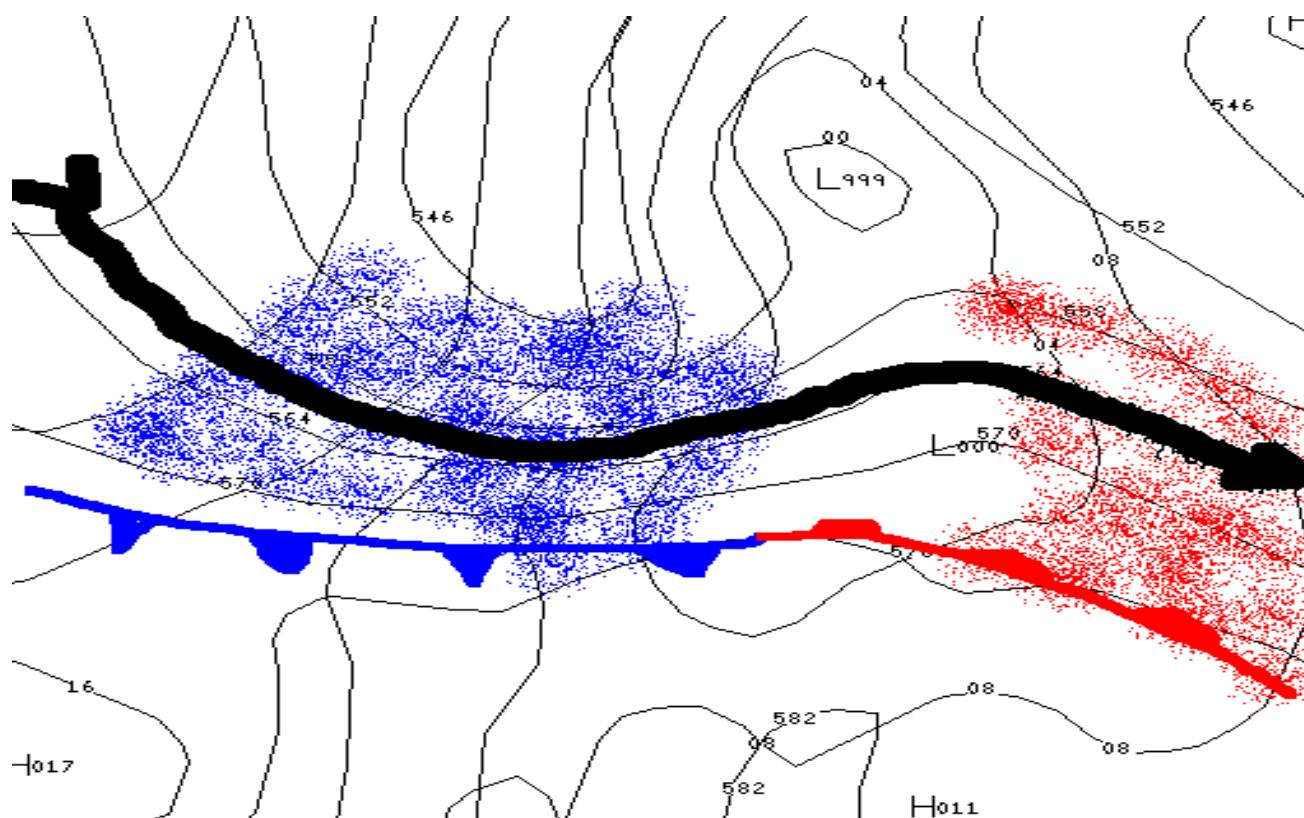
Frontal Analysis Procedures



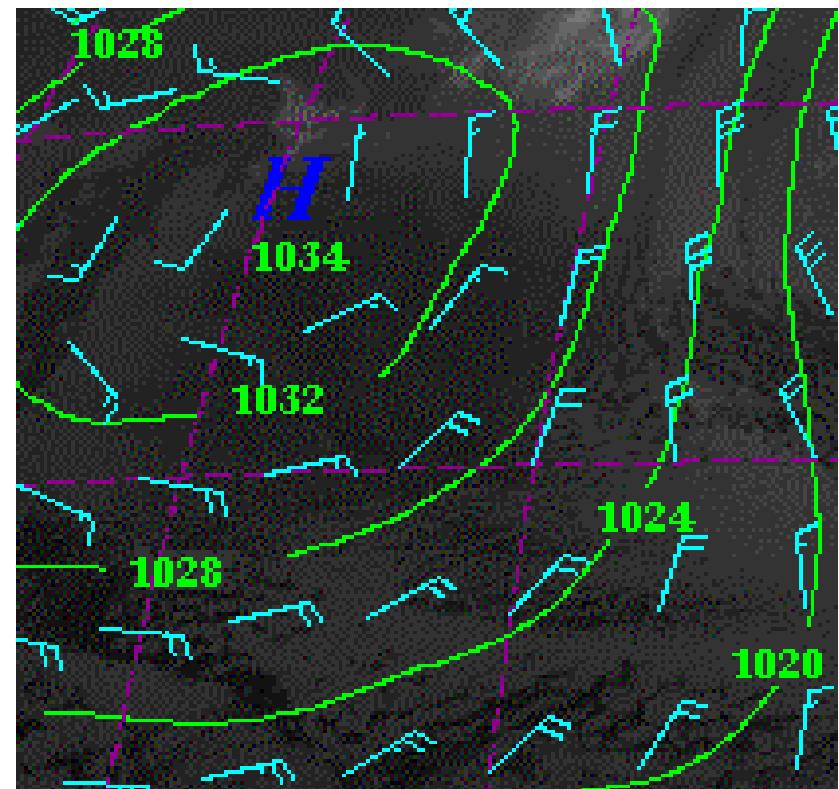
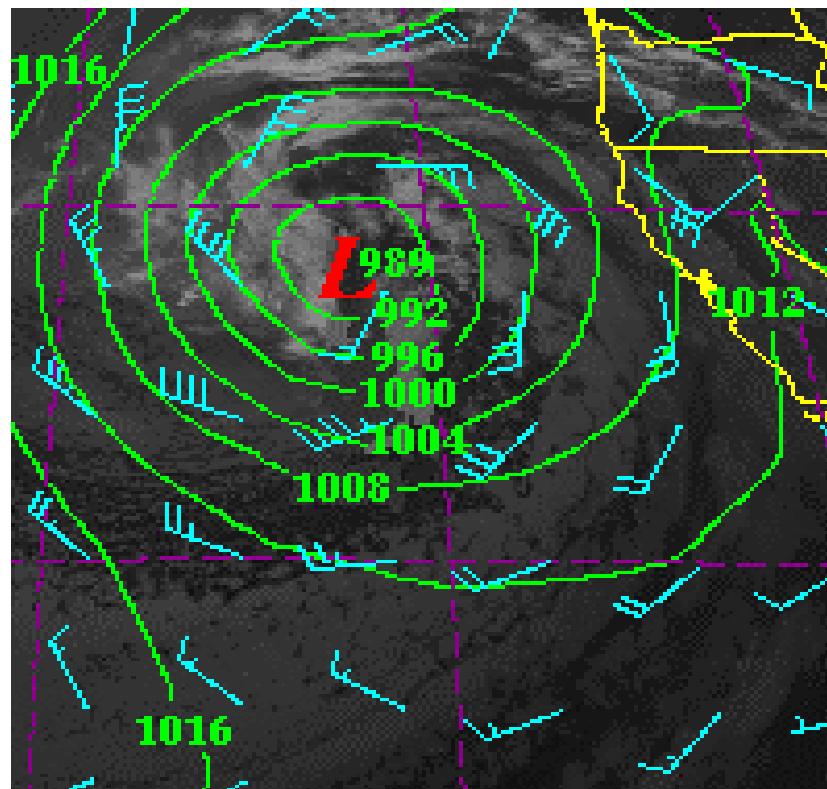
Occluded Fronts

- Occlusions form when a faster moving cold front catches up to a warm front.
- Occlusion occurs when less dense air is pushed up over more dense air.
- Occlusions may be labeled cold or warm

SFC/1,000-500 mb Thickness



Buys Ballot's Law

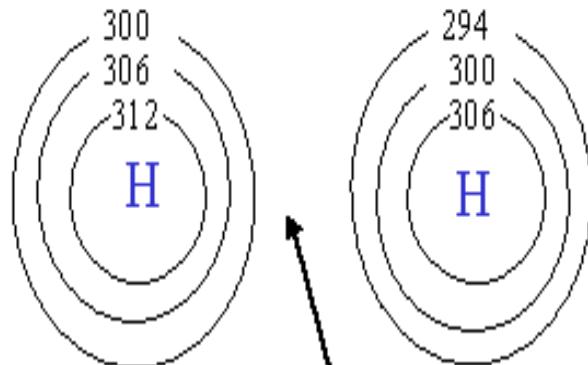


Analysis Considerations – Data Errors

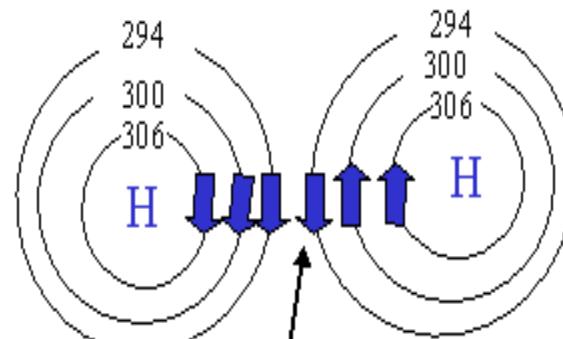
Data Representativeness – Not all observations may be correct

- Sensor Representativeness
- Sea-Level Pressure
- Pressure Tendencies
- Temperature

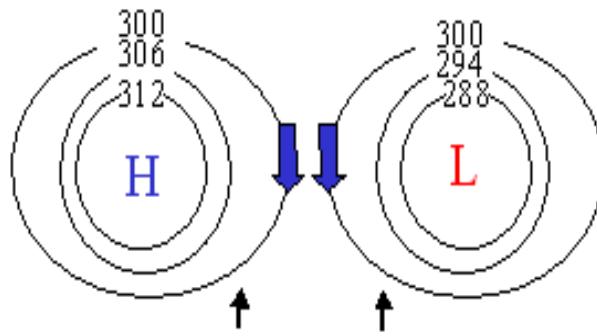
Common Isopleth Errors



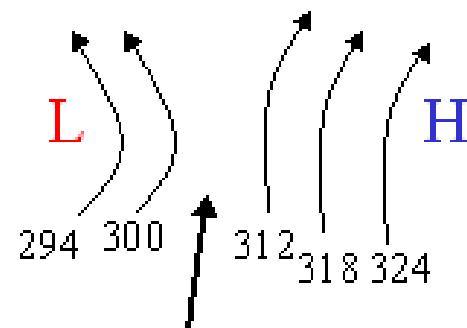
Need another 294 contour here.



Same wind flow along adjacent 294 contours.

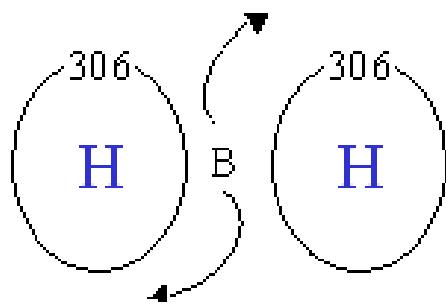


Two 300 contours between adjacent high and low.

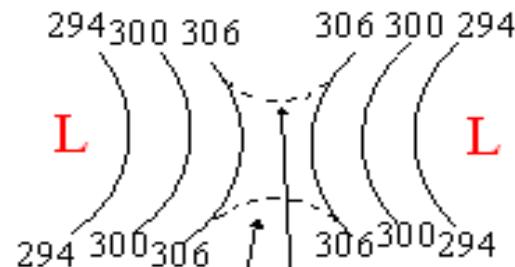


Missing 306 contour line.

Common Isopleth Errors



Wind flow reverses along contour B.



To great wind shear in this area.
Correction shown by dotted lines.

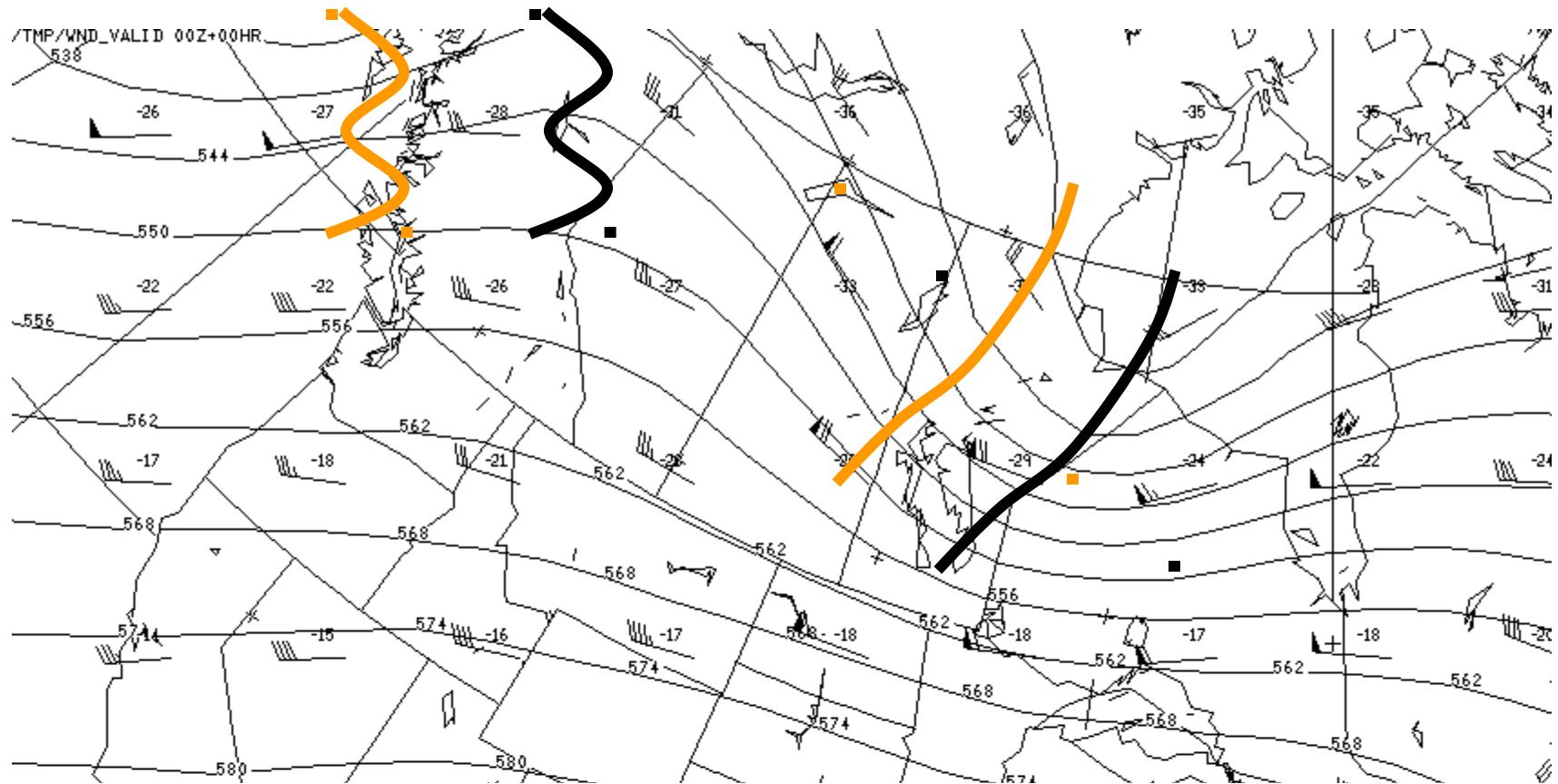
Common Analysis Errors

- Troughs analyzed as fronts
- Impossible stack
- Dropping of fronts
- Inconsistent continuity

Analysis Requirements and Procedures

- Continuity -- Logical progression from one product to the next
- Analyze for the data -- Consider all the data on an analysis as though the data is correct

Continuity



Analysis Considerations

Four analysis task
considerations:

- Pre-analysis Orientation
- Isopleth Analysis
- Data Representativeness
- Analysis

Analysis Considerations

Analysis - Involves three stages:

- Preliminary Analysis
- Basic Analysis
- Final Analysis

Pre-Analysis Orientation

Review the history of the weather situation and check:

- Movements
- Configurations
- Orientation of fronts, lows, highs, troughs, and ridges
- General accuracy of past products

Analysis Tasks

- Examine the current state of the atmosphere
- Ensure each analysis follows in a logical progression

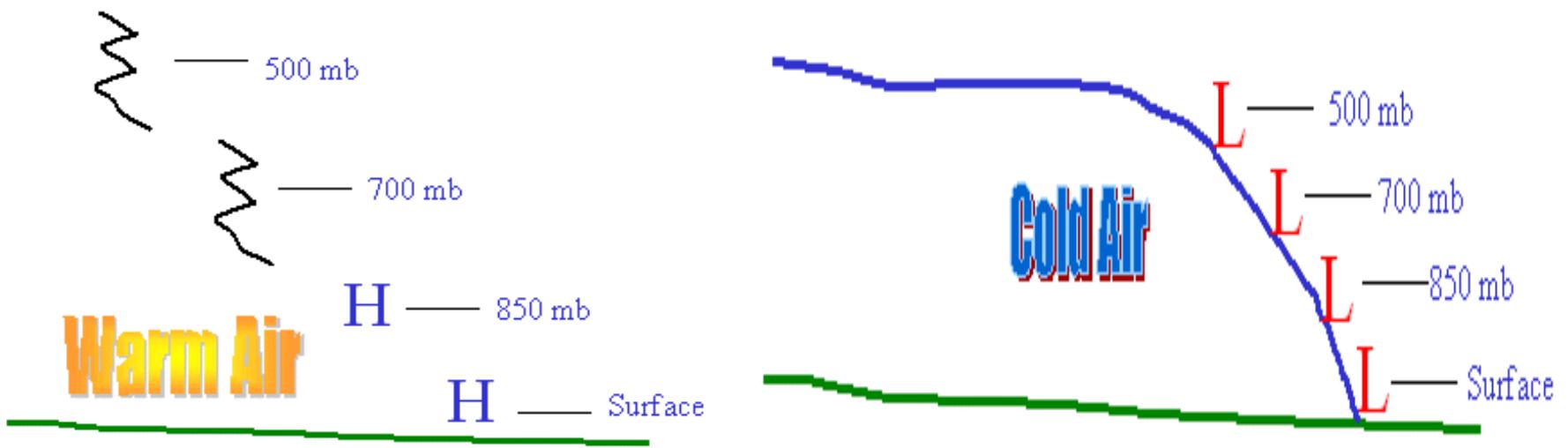
Analysis Procedures

- 850 mb chart:
 - A streamline will often show the existence of the frontal surface.
 - Isotherms packing indicates frontal location

Surface Analysis Rules

- One key to a good surface analysis is to use upper level features.
- Use upper air charts to assist you in stacking surface features
 - Cold fronts stack 1° to 3°
 - Warm fronts stack 3° to 6°
 - Baroclinic lows stack 1° to 3°
 - Barotropic lows and highs are nearly vertical.

Stacking



Conclusion

Any Questions?